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3619
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#5
4-23-02
PATENT
Attorney Docket No. 214711

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Didier GLOAGUEN

Application No. 10/004,984

Filed: December 3, 2001

For: PROTECTIVE COVERS

Art Unit: 3619

Examiner: Unassigned

CLAIM OF PRIORITY

Commissioner for Patents
Washington, D.C. 20231

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APR 22 2002
GROUP 3600

Dear Sir:

In accordance with the provisions of 35 USC 119, Applicant claims the priority of the application or the applications (if more than one application is set out below):

Application No. 0029621.0, filed in the United Kingdom on
December 5, 2000.

Certified copies of the above-listed priority documents are enclosed.

Respectfully submitted,

Gordon R. Coons, Reg. No. 20821
One of the Attorneys for Applicant(s)
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180 North Stetson
Chicago, Illinois 60601-6780
telephone: (312) 616-5600
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Date: March 26, 2002

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PATENT
Attorney Docket No. 214711

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Didier GLOAGUEN

Art Unit: 3619

Application No. 10/004,984

Examiner: Unassigned

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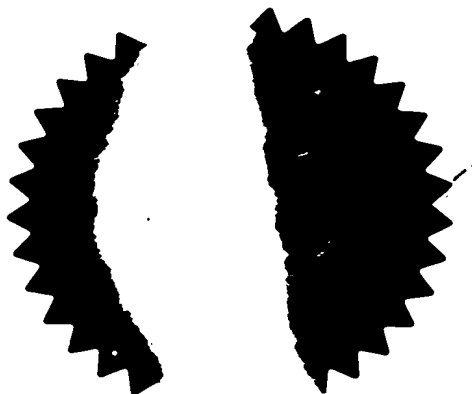
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13 February 2002



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Office**

Statement of inventorship and of right to grant of a patent

The Patent Office

Cardiff Road
Newport
Gwent NP9 1 RI

1. Your reference
1/P32475GB

2. Patent application number
(if you know it) **0029621.0** **05 DEC 2000**

3 Full name of the or of each applicant
DRAFTEX INDUSTRIES LIMITED

4. Title of the invention
PROTECTIVE COVERS

5. State how the applicant(s) derived the right
from the inventor(s) to be granted a patent

by virtue of the inventor's employment by an associated
company of the Applicants and by virtue of the assignment to
them.

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7/77 are attached to this form?
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7. I/We believe that the person(s) named over the page (and on
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which the above patent application relates to.

Signature

Date 5th December 2000

MATHISEN, MACARA & CO.

8. Name and daytime telephone number of
person to contact in the United Kingdom **MR D.M. FOSTER (01895 678331)**

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- e) Once you have filled in this form you must remember to sign and date it

Enter the full names, addresses and postcodes of the inventors in the boxes and underline the surnames

Didier GLOAGUEN
6, chemin des Grands Jardins
La Crespelière
44310 Saint Philbert de Grand Lieu
FRANCE

Patents ADP number (if you know it): 8037079001

Patents ADP number (if you know it).

Reminder

Have you signed the form?

Patents ADP number (if you know it):



The Patent

Office

06DEC00 E589056-1 D02855
P01/7700 0.00-0029621.0

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The Patent Office

Cardiff Road
Newport
Gwent NP9 1 RH

1. Your reference 1/P32475GB

2. Patent application number
(The Patent Office will fill in this part)

0029621.0

05 DEC 2000

3. Full name, address and postcode of the or of each applicant (underline all surnames)

DRAFTEX INDUSTRIES LIMITED

7 Castle Street
Edinburgh
EH2 3AP

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

U.K. 415 76 0004

4. Title of the invention

PROTECTIVE COVERS

5. Name of your agent (If you have one)

MATHISEN/MACARA & CO.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

The Coach House
6-8 Swakeleys Road
Ickenham, Uxbridge
UB10 8BZ

Patents ADP number (if you know it)

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Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

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Abstract 1

Drawing(s) 3

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) 2

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Signature Date

5TH December 2000

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PROTECTIVE COVERS

The invention relates to protective covers and more particularly but not exclusively to protective covers for protecting moving parts in a mechanism of motor vehicles.

According to the invention, there is provided a protective cover for a motor vehicle joint, the cover having a deformable structure defining an interior space closed at both ends and including vent means coupled to the interior space, the vent means including a vent element adapted to allow fluid flow thereacross whilst stopping contaminant and/ or water entering into the interior space whereby excess fluid pressure within the interior can be reduced by fluid evacuation and aspiration through the vent means.

Typically, the fluid will be air.

Protective covers embodying the invention will now be described, by way of example with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a schematic front elevation of a steering arrangement with protective covers;

Figure 2 is a schematic front elevation of the steering arrangement depicted in Figure 1 turned to the right;

Figure 3 is a schematic front elevation of the steering arrangement depicted in Figures 1 and 2 turned to the right and subject to suspension articulation;

Figure 4 is a schematic front elevation of a transmission arrangement with protective covers;

Figure 5 is a cross-section through one of the protective covers embodying the invention;

Figure 6 is an enlarged view of the portion of Figure 5 shown at II; and,

Figure 7 is an end view of part of a connector shown in Figure 6, looking in the direction of the arrow III;

The protective cover arrangement 10 shown in Figures 5 and 6 comprises a small diameter sealing collar 12 at one end and a larger diameter sealing collar 14 at the opposite end, with a plurality of bellows turns 16 integrally extending between the two ends. In use, the two sealing collars are attached to two relatively movable parts of a mechanism (not shown) which is to be protected in a motor vehicle. The cover 10 protects the mechanism from ingress of water, dirt and other contamination.

In one particular application of the protective cover shown in Figures 1 to 3, two of them are respectively mounted to protect the ends of a steering rack of a steering arrangement

100 in a vehicle. Thus, the steering arrangement 100 may comprise a steering box 104 operated directly by the driver's steering wheel 105 or through the intermediary of a power steering arrangement. A steering rack extends outwardly in opposite directions from each side of the steering box 104 and is moved axially in one or the other direction by the steering box in response to steering action by the driver. The opposite ends of the rack are connected to turn the steerable wheels 103 of the vehicle. In use, a cover 110 extends from one side of the steering box 104, with its larger diameter fixing collar 114 being secured to the steering box 104 where the steering rack extends outwardly therefrom. The smaller diameter collar 112 of the cover 110 is secured to the distal end of the rack.

At the opposite side of the steering box 104, from which the second end of the rack protrudes, a second cover 110 is secured, with its smaller diameter collar 112 fixed to that distal end of the steering rack.

The two protective covers 110 thus protect the two end portions of the rack and the bellows flexibly accommodate axial movement.

As the steering rack moves to and fro, in order to carry out desired steering action, the two protective covers 110 will be alternately compressed and expanded as will now be explained in more detail.

It will be noted from Figure 1 that the steering arrangement depicted has wheels 103 in a straight-ahead configuration. Thus, the steering box 104 is not displacing the steering rack either to the right or the left. In such circumstances, the protective covers 110 are not generally deformed (that is, not compressed or stretched), and so the interior volumes of these covers 110 will be substantially at their designed pressure, normally atmospheric. Thus, these covers 110 should not rupture, create noise problems or alter the function of the underlying steering mechanism.

In Figure 2, the steering arrangement of Figure 1 has been turned to the right. Thus, cover 110a is compressed whilst cover 110b is expanded. The covers 110 are sealed by collars 112, 114 at each end. Therefore, the compressed cover 110a would normally be at an elevated pressure whilst the expanded cover 110b would be at a reduced pressure.

Similarly, in Figure 3, the covers 110 are respectively further expanded (110b) and compressed (110a) by suspension 111 movement to accommodate bumps as the vehicle including the steering arrangement moves.

Figure 4 shows how a similar problem can arise with a drive shaft or transmission arrangement. A drive shaft 201 extends between an outboard joint 230 and an inboard joint 231. The outboard joint 230 is supported by a suspension 233 and the wheel 234. In such circumstances, the protective covers 232 can be angled and the protective cover 236 can be compressed or expanded. The pressure variation appears only in the inboard

joint 231.

It is necessary to accommodate the resultant changes in pressure in the protective covers. If this is not done, excessive pressure may rupture the protective covers. One known way of dealing with this problem, is to interconnect the interiors of the two covers used at respective ends of a steering rack. In this way, when one cover is contracted by movement of the steering rack, the increased pressure within the now deformed cover is transmitted to the interior of the other cover which will at the same time be expanded.

In accordance with a feature of the covers being described, this interconnection between the two bellows at opposite ends of the steering rack is removed in order to allow easier assembly and to reduce costs.

Referring to Figure 5, the bellows 10 there shown has a vent arrangement 20 at one end. The vent 20 is L-shaped in form, comprising a relatively long hollow tubular part 22 and a relatively short hollow tubular part 24. Each part 22,24 has an open end 22A,24A. As shown in Figures 5 and 6, the vent 20 is secured in position on the cover 10 so that the end 24A is attached to the wall of the bellows adjacent the larger diameter collar 14 and with the hollow interior of the part 24 thus open to the interior 25 of the cover 10. The part 24 of the vent 20 thus extends radially of the major axis of the cover 10 and the part 22 of the connector extends in an axial direction.

Such a bellows 10 can therefore be mounted at one end of a steering rack (for example, as shown in Figures 1 to 3) or at one end of a drive shaft (for example, as shown in Figure 4). A similar bellows would then be mounted at the other end of the steering rack or drive shaft.

The vent 20 of the bellows 10 at the other end of the rack or drive shaft would be mounted on the bellows in the same way.

Each vent 20 is very firmly secured to the bellows 10. A welding operation can be used to form a very strong welded bond between the material of the vent 20 and the material of the bellows 10. In addition, a mechanical bond is formed between the vent 20 and the material of the bellows 10 where it enters the end 24A of the vent 20. However, the vent 20 could be mounted on the bellows 10 by a glueing operation.

It will be appreciated that the vent 20 can be situated at any desired position on the external wall of the bellows.

At the open end of 22a of each vent 20, a vent element 21 is located. The purpose of this element 21 is to allow air to pass into and out of the bellows 10 whilst preventing ingress of contaminants and water to the interior volume 25.

In effect, the vent 20 and the vent element 21 adjust the volume of air within the interior

so that it is consistent with air pressure. In such circumstances, the vent element 21 acts as a filter to prevent transfer of contaminants, such as grit, grease, etc. and water, into the interior, allowing relatively free movement of air to adjust the volume of the interior 25 as the cover 10 is deformed in extension or compression. In such circumstances, the vent 20 prevents excessive fluid (air) pressure build-up in the interior 25 and will normally maintain that interior at about atmospheric pressure. Furthermore, with a lubricant inside the protective cover 10 it will be understood this lubricant is prevented from escaping and so facilitating continued lubrication of a protected mechanism.

The vent element 21 can be formed of a Teflon (Trade Mark) material of calibrated porosity to allow air movement but to prevent contaminants or water entering the interior 25. Clearly, the specific material used is dependent upon the installation requirements; suitable other materials may be used.

The vent 20 and vent element 21 remove the necessity of a connecting tube between the pair of protective covers 10. Thus, installation and maintenance of the cover 10 is made less difficult and costly.

In order to extend the operational life of vent element 21, it will be understood that at least a proportion of any contaminants and/or water will be removed from the element 21 as air or fluids flow out of the interior 25.

This vent works also to avoid any variation of pressure due to external temperature or atmospheric pressure variation.

CLAIMS

1. A protective cover for a motor vehicle articulating joint, the cover having a deformable structure defining an interior space closed at both ends and including vent means coupled to the interior space, the vent means including a vent element adapted to allow fluid flow thereacross whilst stopping contaminants and/ or water entering into the interior space whereby excess fluid pressure within the interior can be reduced by fluid evacuation and aspiration through the vent means.
2. A cover as claimed in claim 1, wherein the fluid is air.
3. A cover as claimed in claim 1, 2 or 3, wherein the deformable structure is a flexible bellows.
4. A cover as claimed in claim 1, 2 or 3, wherein the deformable structure is secured at each end with a respective collar element.
5. A cover as claimed in any one of claims 1 to 4, wherein the fluid pressure within the interior is maintained at a desired fluid pressure.
6. A cover as claimed in claim 4, wherein the desired fluid pressure is that of the ambient atmospheric air pressure adjacent the protective cover.

7. A protective cover as claimed in any preceding claim , wherein the vent means is located at one end of the deformable structure.
8. A cover as claimed in any preceding claim, wherein the vent element comprises a porosity-calibrated material structure.
9. A cover as claimed in claim 8, wherein the material structure is a Teflon.
10. A cover as claimed in any preceding claim, wherein the vent element is replaceable in the vent means.
11. A cover as claimed in any preceding claim, wherein the vent element is adapted to expel at least some of any contaminates and/or water associated with it upon outward fluid movements through the vent element as the deformable structure and therefore the interior space is deformed.
12. A cover as claimed in any preceding claim, wherein the vent means is configured as a spout comprising a first portion outwardly perpendicular to the major axis of the cover and a second portion parallel to that major axis of the cover whereby the vent means has a substantially "L" shaped configuration.
13. A cover as claimed in any preceding claim, made from an elastomeric material.

14. A cover as claimed in any preceding claim, wherein the vent means is arranged to allow fluid air flow thereacross.
15. A cover as claimed in any preceeding claim wherein the vent means is adapted to prevent lubricant escaping from the interior space.
16. A protective cover arrangement, comprising protective covers as claimed in any preceding claim respectively secured about the ends of a steering arrangement within a motor vehicle in order to protect that steering arrangement.
17. A protective cover arrangement comprising protective covers as claimed in any of claims 1 to 15 secured about a motor vehicle transmission joint to protect that transmission joint.
18. A protective cover substantially as described with reference to Figures 5 and 6 of the accompanying drawings.
19. A protective cover arrangement substantially as described with reference to Figures 1 to 3 and figures 5 to 7 of the accompanying drawings.
20. A protective cover arrangement substantially as described with reference to Figures 4 to 7 of the accompanying drawings.

ABSTRACT

A protective cover (10) which is generally in the form of a flexible bellows construction secured at each end by collars (12, 14) in order to define an interior space (25) includes vent means (20). Thus, when the cover (10) is deformed, the volume within the interior (25) is altered by aspiration or evacuation through the vent means (20). The vent means (20) includes a vent element (21) in order to allow air or fluid transfer into and out of the interior (25) but prevent ingress of contaminants such as grit and water to the interior (25).

Figure 5

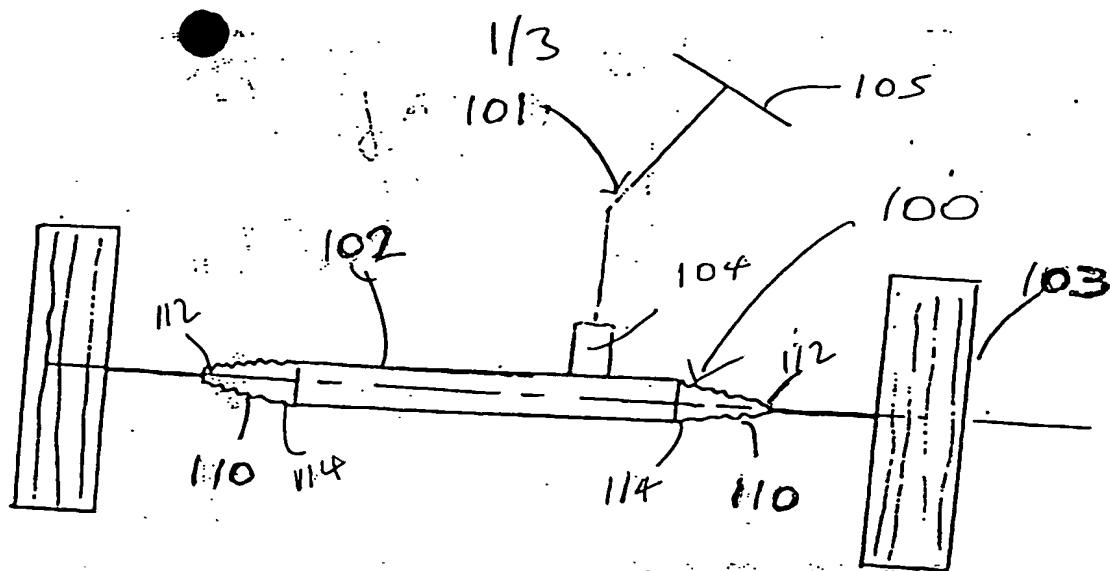


Figure 1

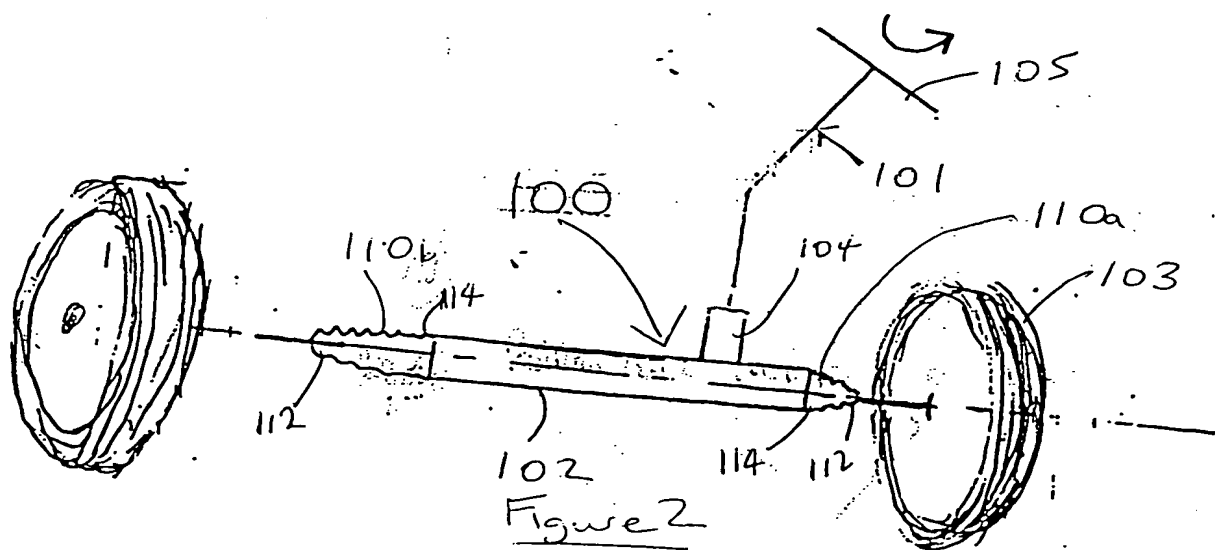


Figure 2

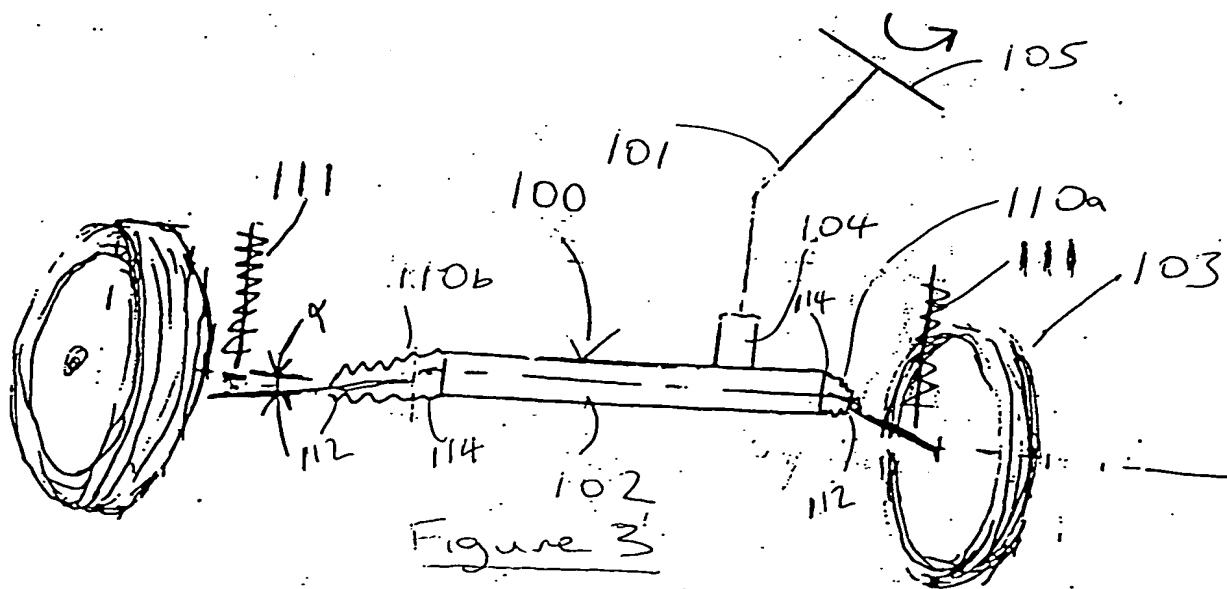


Figure 3

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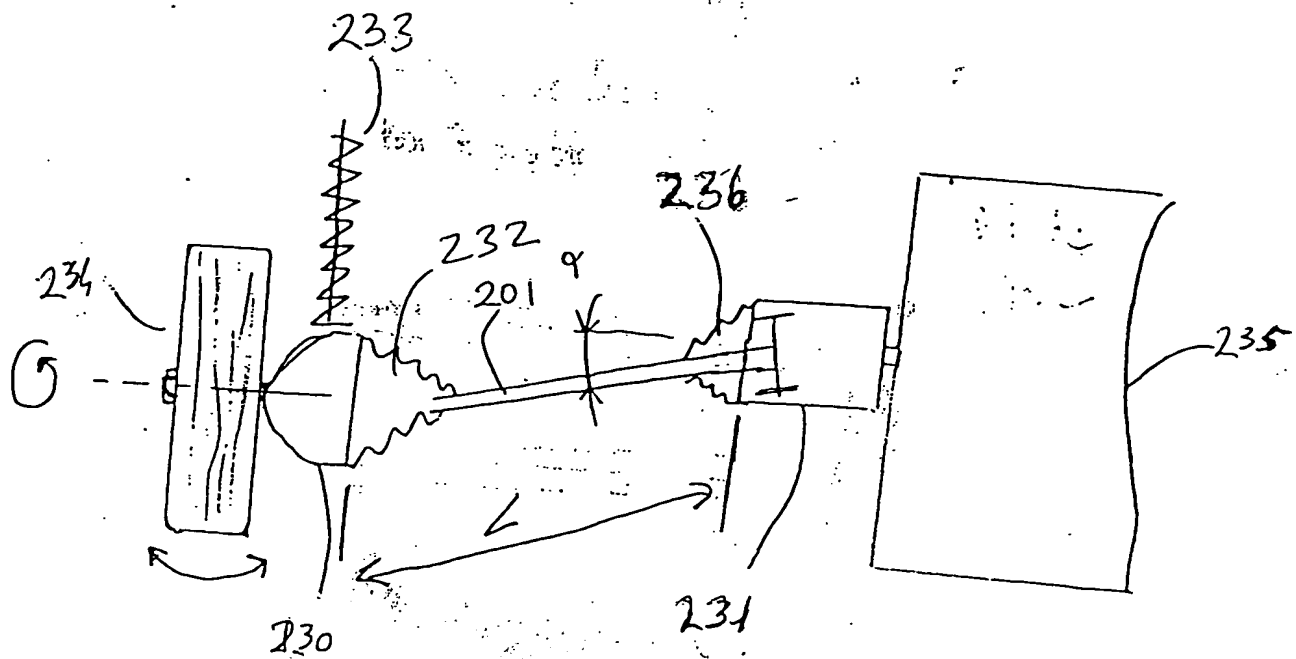
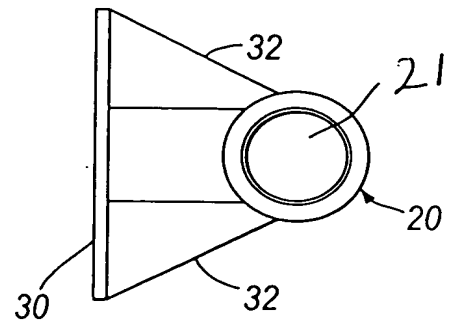
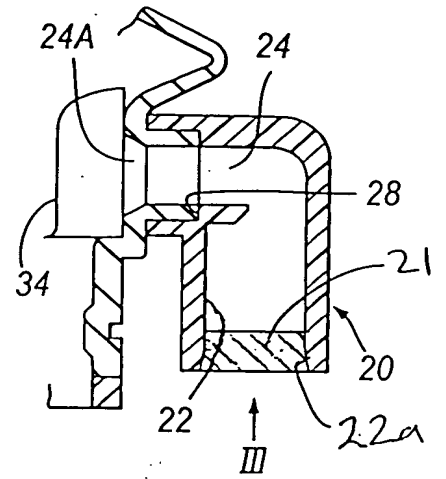
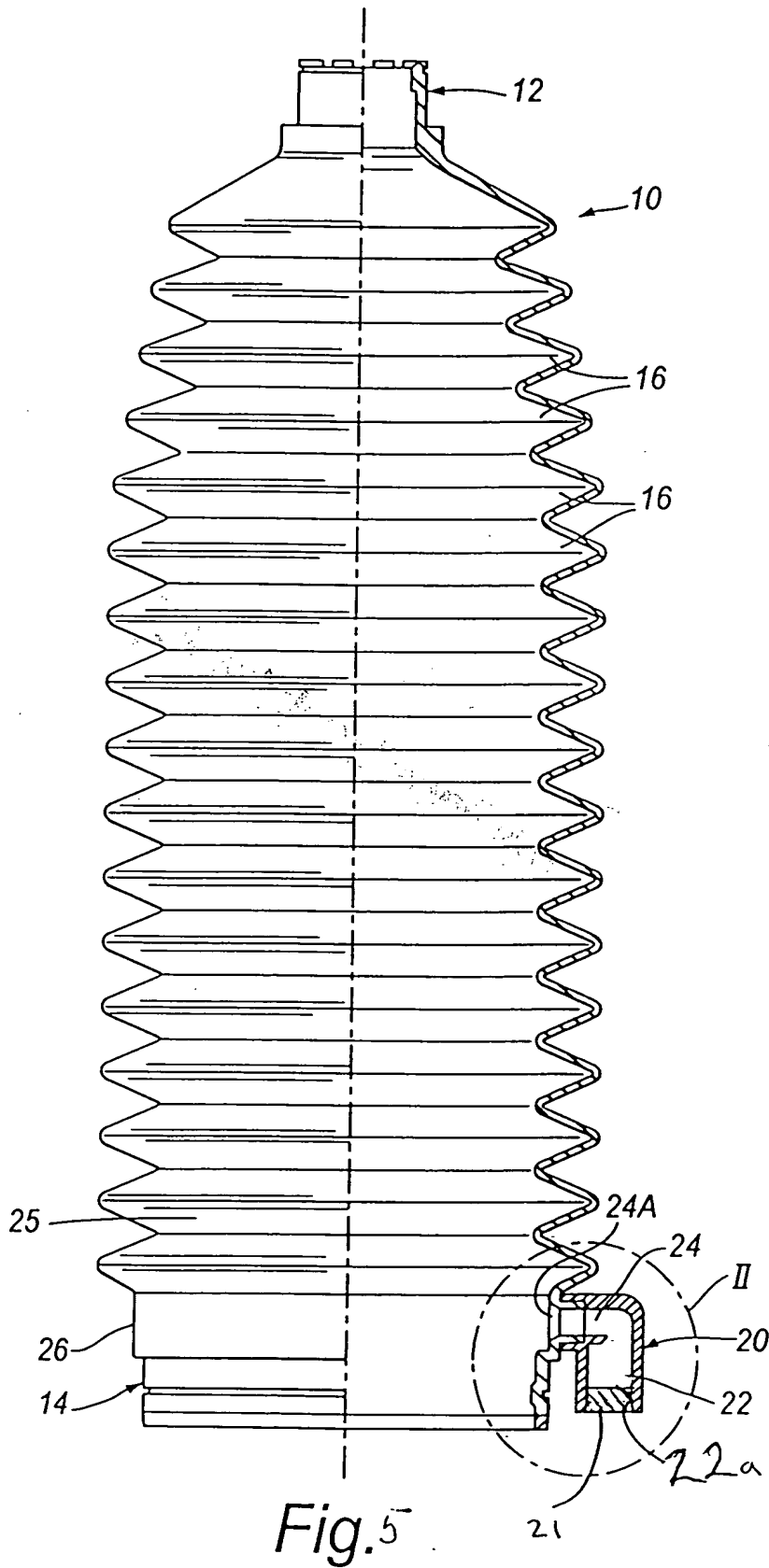


Figure 4

Spare

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Space

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